

2 mi4  
MCR-74-2

Contract NAS8-29777

## Design Drawings

January 1974

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# Universal Stowage Module for Future Space Exploration

(NASA-CR-120173) UNIVERSAL STOWAGE MODULE  
FOR FUTURE SPACE EXPLORATION, DESIGN  
DRAWINGS (Martin Marietta Corp.) 47 p  
HC \$5.50

N74-20535

26 CSCL 22B

G3/31

Unclas  
16533

Prepared for:

National Aeronautics and Space  
Administration

George C. Marshall Space Flight Center

Marshall Space Flight Center,  
Alabama 35812

**MARTIN MARIETTA**

Contract NAS8-29777  
MCR-74-2

DESIGN DRAWINGS


UNIVERSAL STOWAGE MODULE  
FOR FUTURE SPACE EXPLORATION

January 4, 1974

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DENVER DIVISION  
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## FOREWORD

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This report describes the design of the Universal Stowage Module that is intended for use on Shuttle payloads. This document presents the results of work performed by the Martin Marietta Corporation's Denver Division for the National Aeronautics and Space Administration, George C. Marshall Space Flight Center. This report was prepared as partial fulfillment of Contract NAS8-29777, Universal Stowage Module for Future Space Exploration. The NASA Technical Monitor was Mr. Paul Artis, of the Astronautics Laboratory, Mechanical and Crew Systems Integration Division.

## ABSTRACT

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This report describes the design drawings accomplished under contract NAS8-29777 to develop, design, and fabricate a prototype Universal Stowage Module with universal restraints that are readily adaptable for most sizes and shapes of items that would be launched into space and returned aboard shuttle payloads.

DRAWING LIST

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Martin Marietta Corporation

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FOLDOUT FRAME

2

(8-PLCS.) SEE NOTE 1

-006 (4-PLCS.)

-010 (4-PLCS.)

-001

.75 TYP.

.38 TYP.

.19 TYP.

.69 TYP.

1.19 TYP.

1.69 TYP.

2.19 TYP.

.125 DIA. x 100° C SINK HD.  
AL. RIVET - TYP. (HINGE TO DOOR)  
(FLUSH HD. THIS SIDE)

.125 DIA. x 100° C SINK HD. AL. RIVET - TYP.  
(HINGE TO FRAME) (FLUSH HD. THIS SIDE)

ADJUST HINGES TO DESIRED  
AMOUNT OF DRAG

-009-1

.63 TYP.

.50 TYP.

1.00 TYP. SPACERS

.125 DIA. x 100° C SINK HD.  
AL. RIVET - TYP.  
(FLUSH HD. INSIDE MODULE)

CALFAX RET. RING  
#CA1826-1 (2-PLCS.)

-009

UNIVERSAL STORAGE MODULE  
ASSEMBLY

ACTUAL WT. = 67.5 LBS.

(4-PLCS.) -039

-029

-019-2 (TOP & BOTTOM)

-019-3 (BOTH SIDES)

-008 (4-PLCS.)

\*10-32 UNF x .375 LONG 100° CSK.  
SOC. HD. SCR. (8-PLCS.)

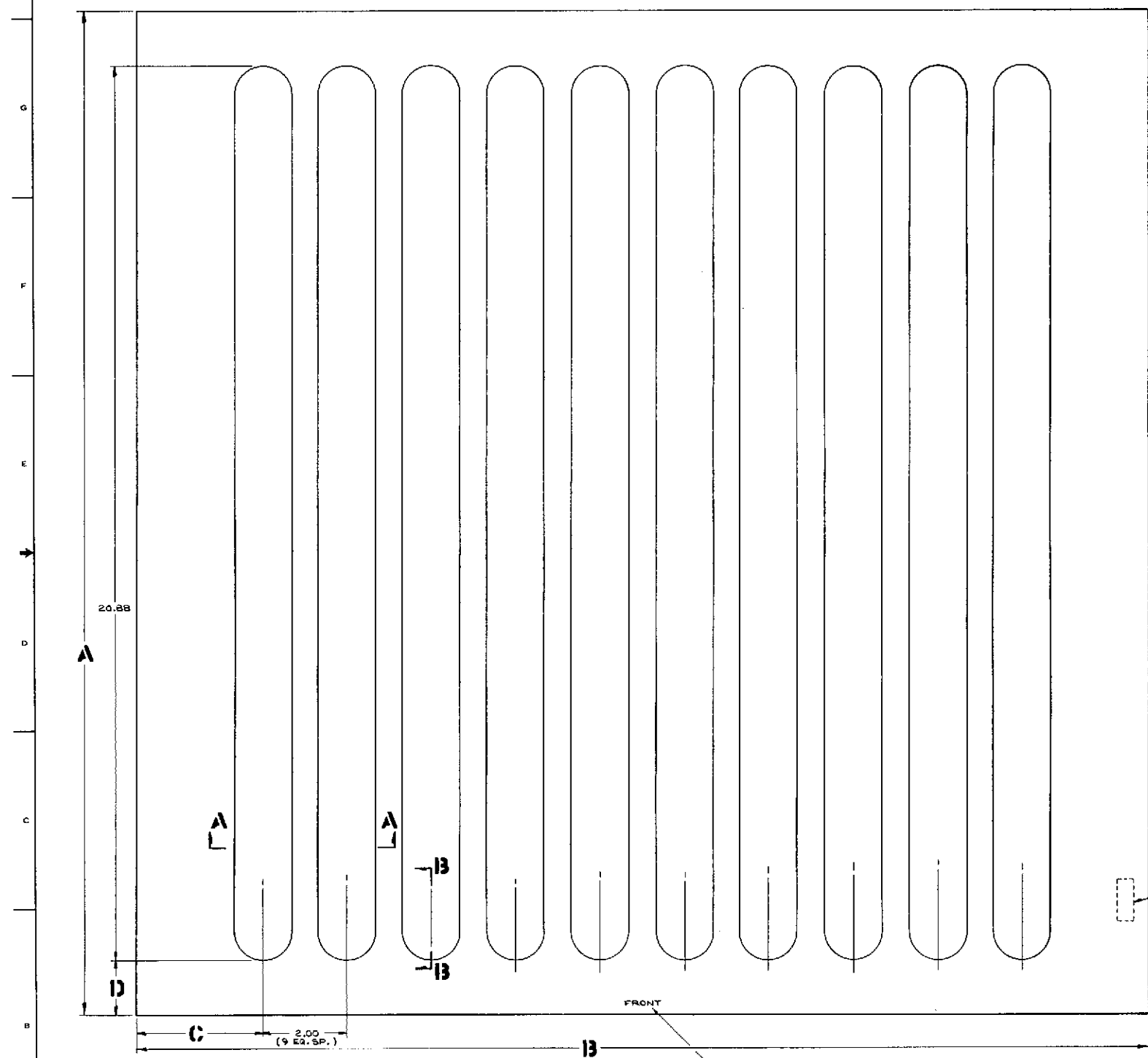
CALFAX KNURLED HD. STUD  
#CA1876-4 (2-PLCS.)

[illegible]

FOLDOUT FRAME

FOLDOUT FRAME 2

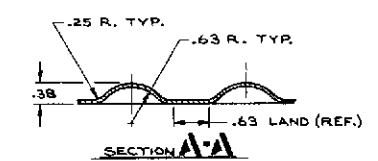
REVISIONS			
REV.	DATE	DESCRIPTION	APPROVED
1		INITIAL RELEASE	0-15-73 V.A. 103



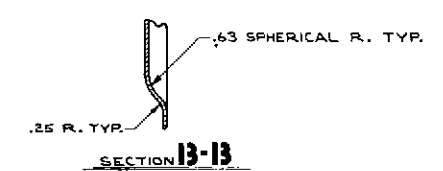
TAB No.	DIM. A	DIM. B	DIM. C	DIM. D	NUMBER REQ'D.
1	24.240	24.240	3.13	1.69	1
2	23.990	24.240	3.13	1.69	2
3	23.990	23.990	3.00	1.69	2

(SEE NOTE 4)

- NOTES:
- 1.125" OR STOCK F.A.O.
  2. MATL. TO BE .063 THK. 2024-T3 AL. (FORM PART AS 2024-0 & HEAT TREAT TO 2024-T3)
  3. BREAK EDGES .010 ± .005
  4. MARK PARTS 003-1, 003-2 & 003-3



003 BEADED PANEL



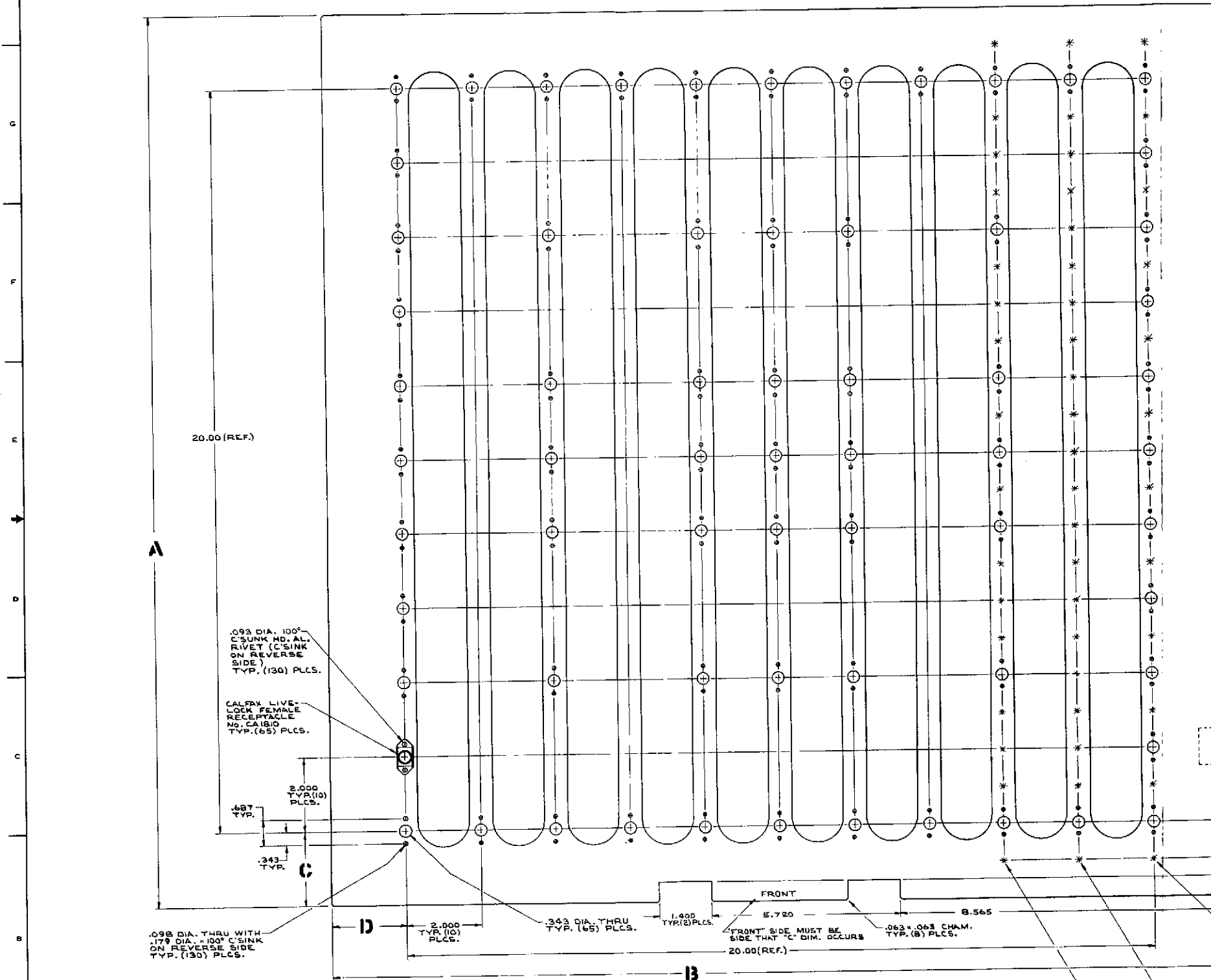
STAMP FRONT OF PANELS AS SHOWN (TO BE SAME SIDE THAT DIM. 'D' OCCURS)

UNIVERSAL STOWAGE MODULE ASSEMBLY	
M. HUSSEY	
04236	
B49USM00000	
2 OF 9	

# FOLDOUT FRAME

FOLDOUT FRAME 2

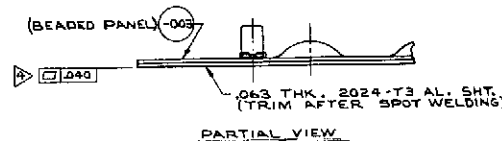
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1	10-15-78	INITIAL RELEASE		



TAB No.	Q03 No.	FRONT SLOTS	DIM. A	DIM. B	DIM. C	DIM. D	NUMBER REQ'D.
1	003-1	DELETE SLOTS	24.240	24.240	2.180	2.120	1
2	003-2	BUILD AS SHOWN	23.990	24.240	1.995	2.120	2
3	003-3	DELETE SLOTS	23.990	23.990	1.995	1.995	2

(SEE NOTE 3)

- NOTES:
- UNLESS SPECIFIED OTHERWISE:  
TOLERANCES TO BE  $\pm .010$ ,  $\pm .005$  OR STOCK F.A.O.
  - BREAK EDGES  $\pm .010$   $\pm .005$
  - FINE VAPOR HONE BOTH SIDES & CLEAR ANODIZE AFTER WELDING.
  - STAMP PARTS 019-1, 019-2 & 019-3
  - ASSEMBLY TO BE FLAT WITHIN .040



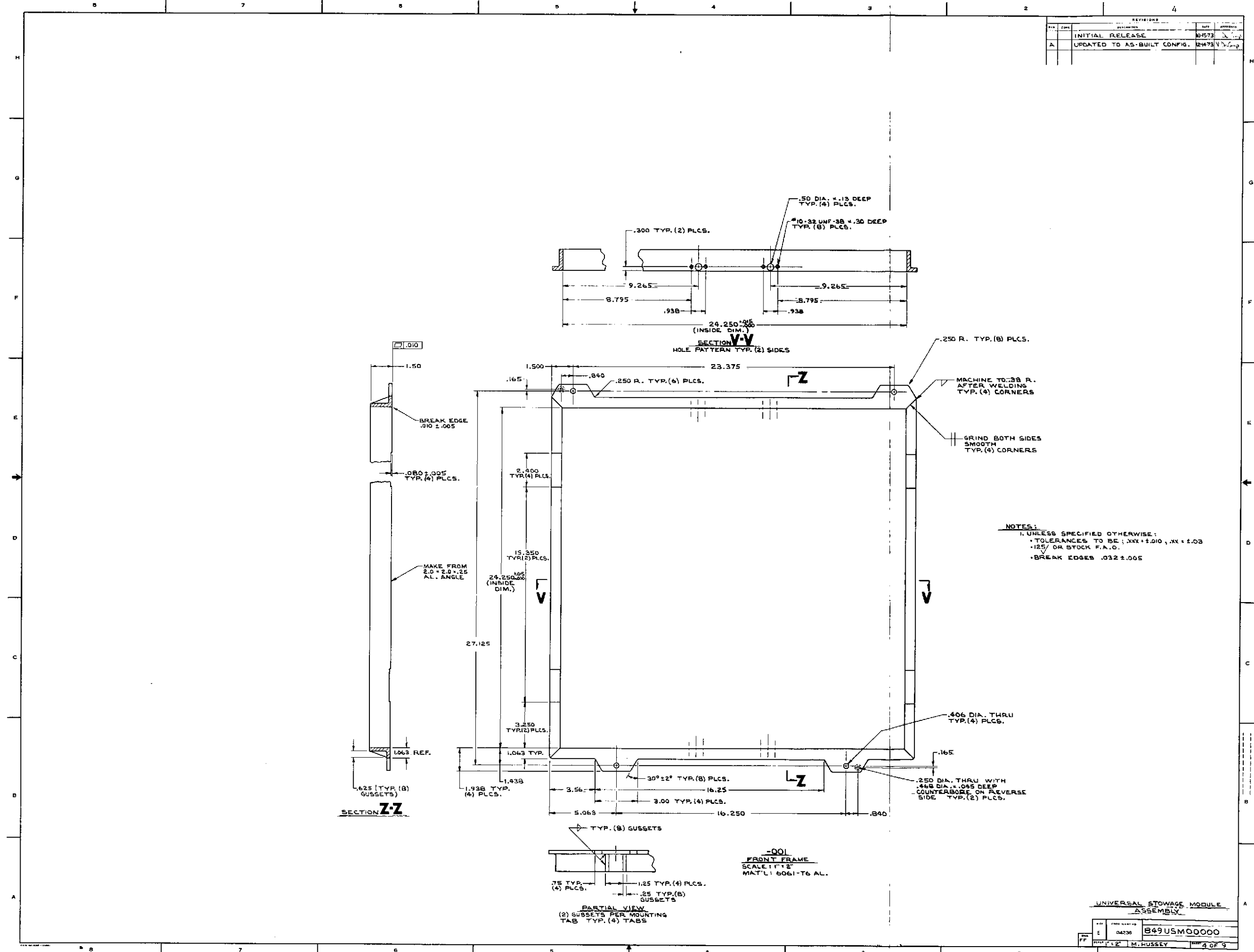
-019  
PANEL ASSEMBLY  
SCALE: FULL  
MAT'L: 2024-T3 AL.

UNIVERSAL STORAGE MODULE  
ASSEMBLY

REV	DATE	DESCRIPTION	BY	APP'D
1	04-28	849USM00000		
PA		FULL M. HUSSEY		30F 9



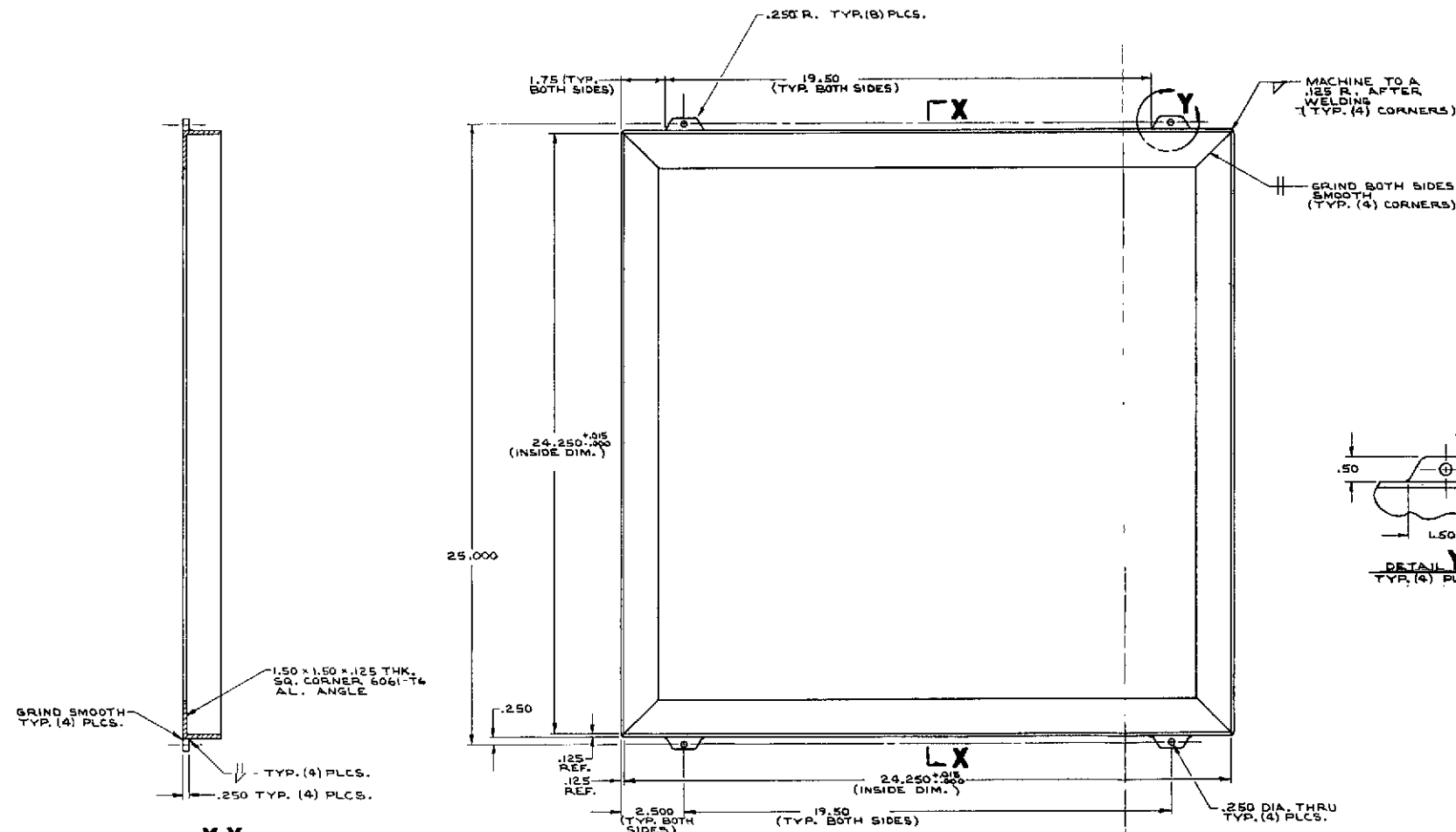
REVISIONS			
REV	DATE	DESCRIPTION	BY
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		UPDATED TO AS-BUILT CONFIG.	12473



FOLDOUT FRAME 1

FOLDOUT FRAME 2

REVISIONS			
REV	DATE	DESCRIPTION	APPROVED
		INITIAL RELEASE	10-15-72
A		DELETED NOTE 2	12-14-73



SECTION X-X

-002  
REAR FRAME  
SCALE 1" = 2"  
MAT'L: 6061-T6 AL.

- NOTES:
- 1. UNLESS SPECIFIED OTHERWISE:
  - TOLERANCES TO BE: .XXX ± .010, XX ± .03
  - .125 OR STOCK F.A.D.
  - BREAK EDGES .010 ± .005

UNIVERSAL STOWAGE MODULE ASSEMBLY			
REV	DATE	DESCRIPTION	APPROVED
E	04230	B49 USM000000	
REV	DATE	DESCRIPTION	APPROVED
1	2	M. HUSKEY	

WOLFOUT FRAME 2

TAB. No.	DESCRIPTION	NUMBER REQ'D.
1	BUILD AS SHOWN	1
2	DELETE RECESS ON UPPER-LEFT DOOR FRONT	1

NOTES:

1. UNLESS SPECIFIED OTHERWISE:  
• TOLERANCES TO BE .XX% ±.010 , .XX% ±.03  
• .125/ DR STOCK F.A.O.  
• BREAK EDGES .010 ±.005
2. FINE VAPOR DONE & ANODIZE AFTER  
MACHINING (COLOR TO BE "PL FAST GOLD")  
(ANODIZE WITH HINGES IN ORDER  
TO ACHIEVE MATCHING COLORS.)
3. STAMP PARTS 004-1 & 004-2.

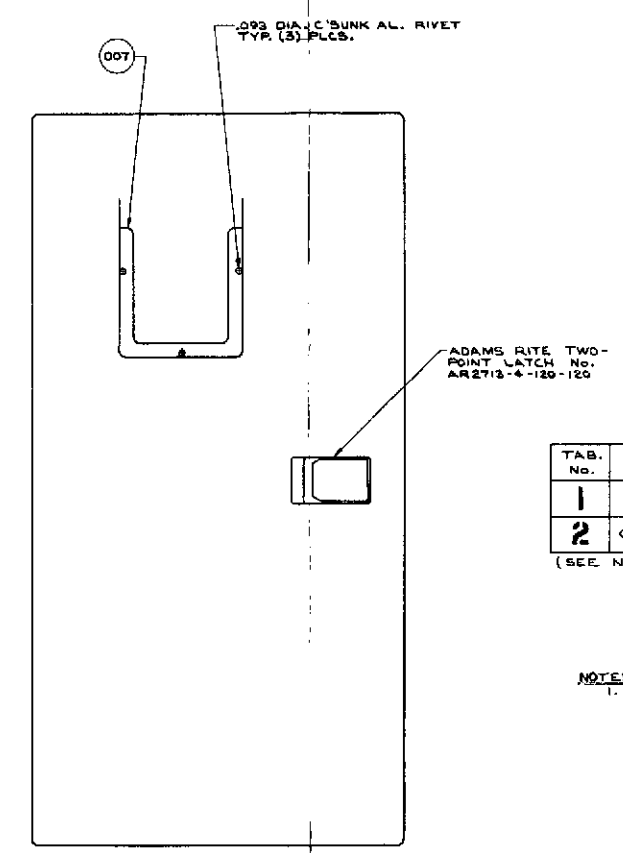
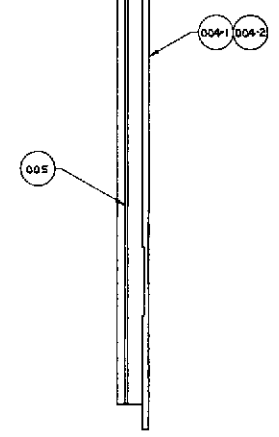
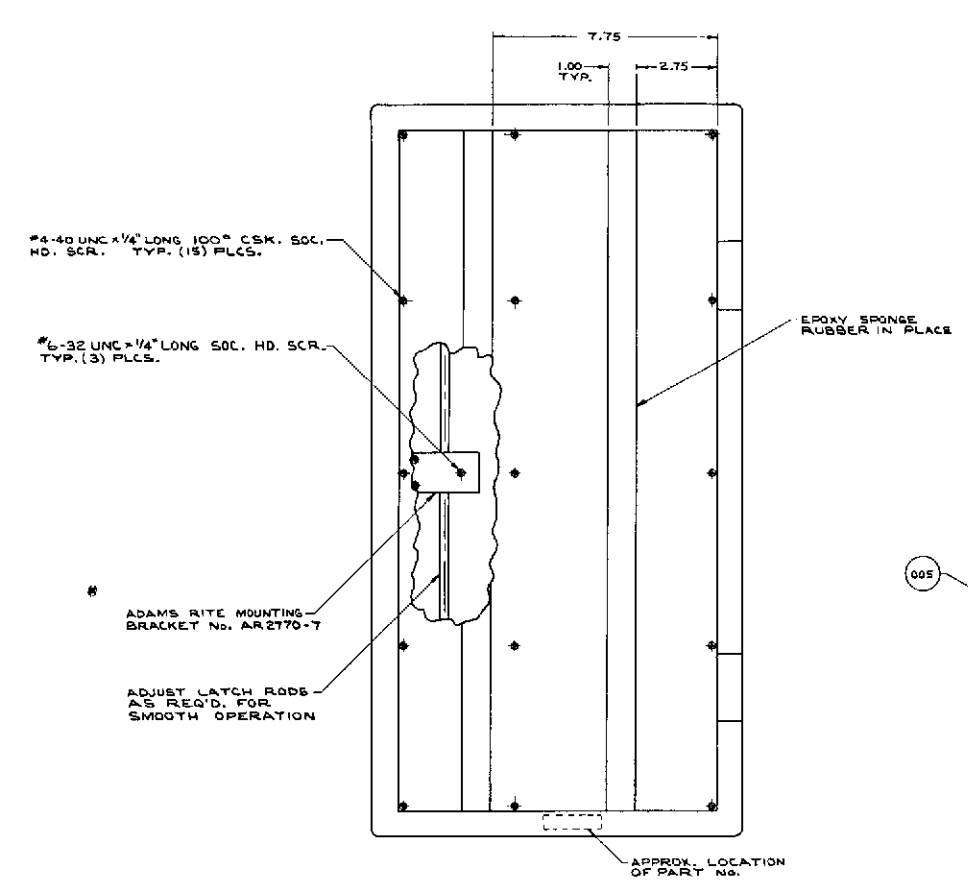
UNIVERSAL STORAGE MODULE  
ASSEMBLY

DATE	CODE IDENT NO	
E	04236	849USM00000
NAME	NO	
M. MUSSEY	2*	6 OF 8

FOLDOUT FRAME

FOLDOUT FRAME 2

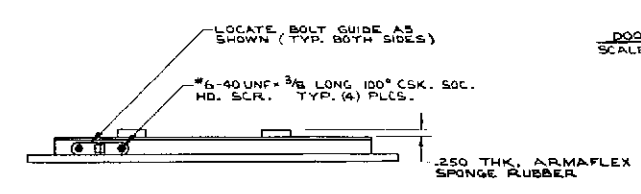
REVISIONS		DATE	DESCRIPTION	BY	APPROVED
1	INITIAL RELEASE	11-28-72			



TAB. No.	004 No.	DESCRIPTION	NUMBER REQ'D.
1	004-1	-007 INSTALLED AS SHOWN	1
2	004-2	NO RECESS -007 DOES NOT APPLY	1

(SEE NOTE 1)

NOTES:  
1. STAMP PARTS 029-1 & 029-2

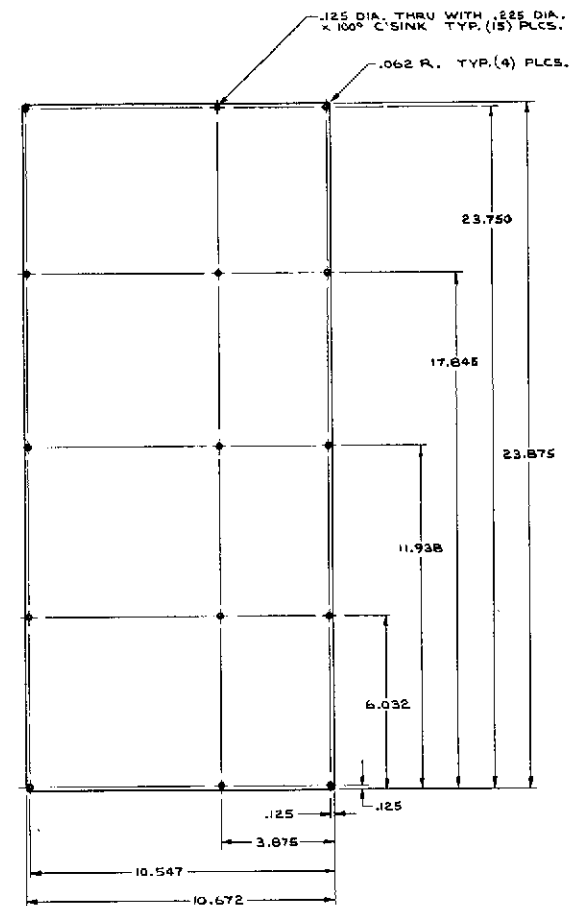


-029  
DOOR ASSEMBLY  
SCALE: 1" = 2"

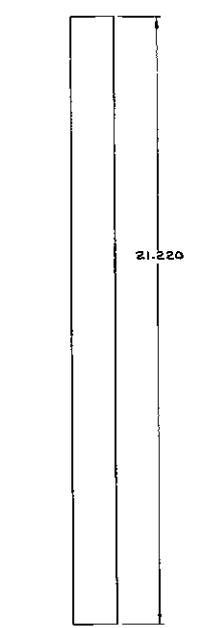
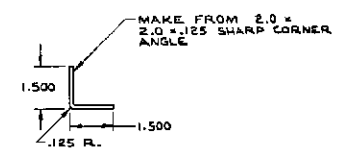
FOLDOUT FRAME

FOLDOUT FRAME 2

REVISIONS			
REV	DATE	DESCRIPTION	BY
1	0-2073	INITIAL RELEASE	1/5/70

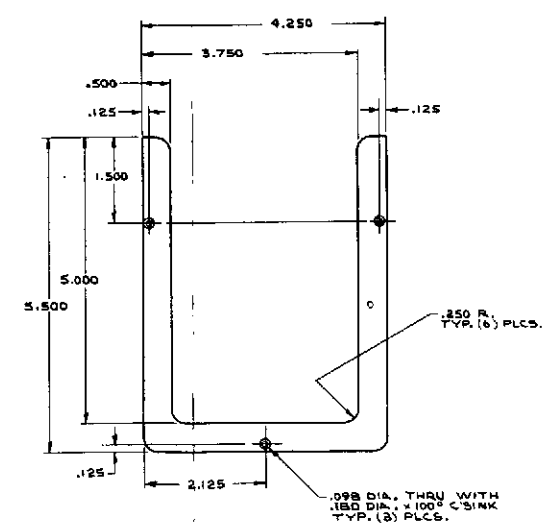
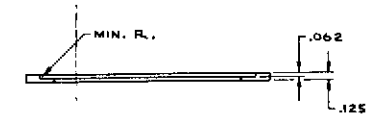
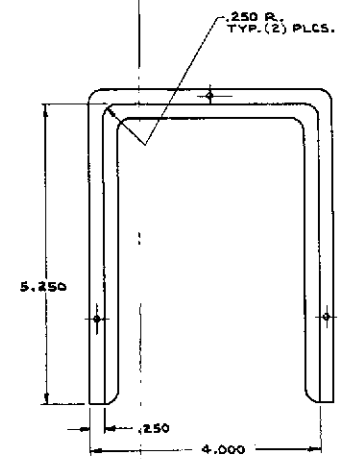


-005  
ACCESS COVER  
SCALE: 1/12  
MAT'L: .062 THK. 6061-T6 AL.  
NOTES:  
1. FINE VAPOR HONE & ANODIZE.  
(COLOR TO BE "RL FAST GOLD")  
WITH DOORS TO ACHIEVE  
MATCHING COLORS.  
2. BREAK EDGES .010 ±.005.  
3. (2) PARTS REQ'D.



-006  
CORNER ANGLE  
SCALE: 1/12  
MAT'L: 6061-T6 AL.  
NOTES:  
1. FINE VAPOR HONE & CLEAR  
ANODIZE.  
2. BREAK EDGES .032 ±.005.  
3. (4) PARTS REQ'D.

GENERAL NOTES:  
1. UNLESS SPECIFIED OTHERWISE:  
TOLERANCES TO BE: .XX ±.010, .XX ±.02  
-125/ OR STOCK F.A.O.

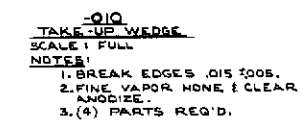
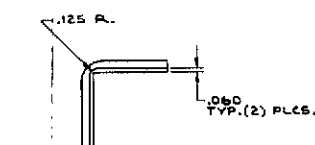
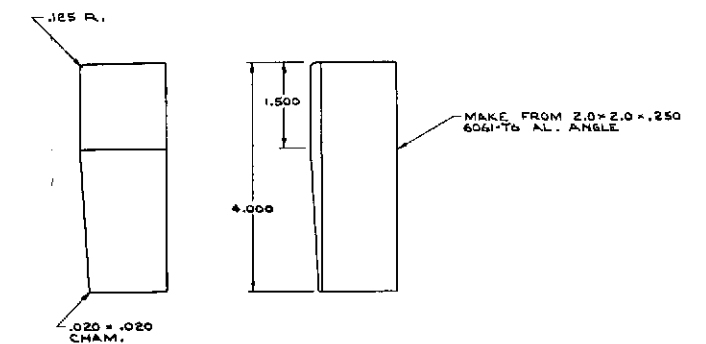
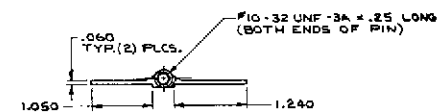
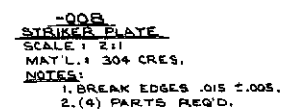


-007  
NOMENCLATURE HOLDER  
SCALE: FULL  
MAT'L: 6061-T6 AL.  
NOTES:  
1. BREAK EDGES .010 ±.005.  
2. FINE VAPOR HONE & ANODIZE.  
(COLOR TO BE "RL FAST GOLD")  
WITH DOORS TO ACHIEVE  
MATCHING COLORS.  
3. (1) PART REQ'D.

SHEET CONTENTS:  
-005 ACCESS COVER  
-006 CORNER ANGLE  
-007 NOMENCLATURE HOLDER

FOLDOUT FRAME 2

11-6-73



SHEET CONTENTS:

- 008 STRIKER PLATE
- 010 TAKE-UP WEDGE
- 039 HINGE ASSEMBLY

GENERAL NOTES:  
1. UNLESS SPECIFIED OTHERWISE:  
• TOLERANCES TO BE: .XXX = ±.010, .XX = ±.03  
• 125/ OR STOCK F.A.O.

UNIVERSAL STOWAGE MODULE  
ASSEMBLY

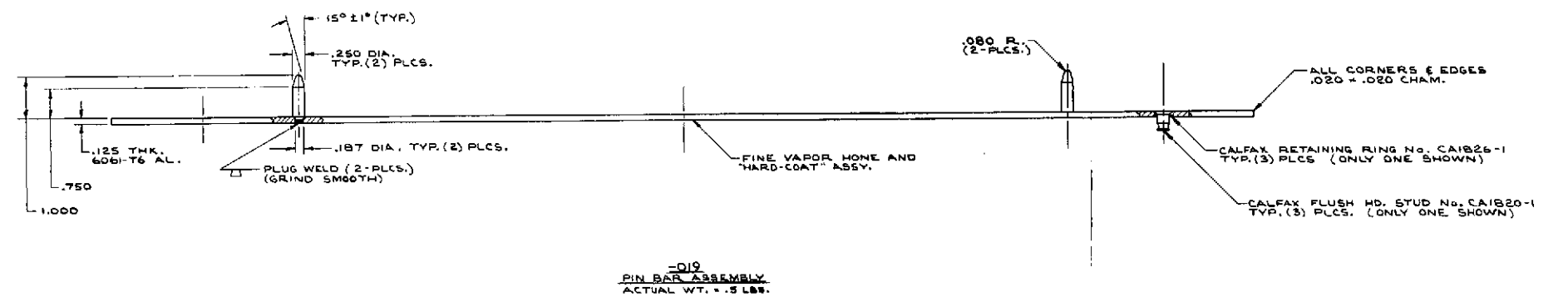
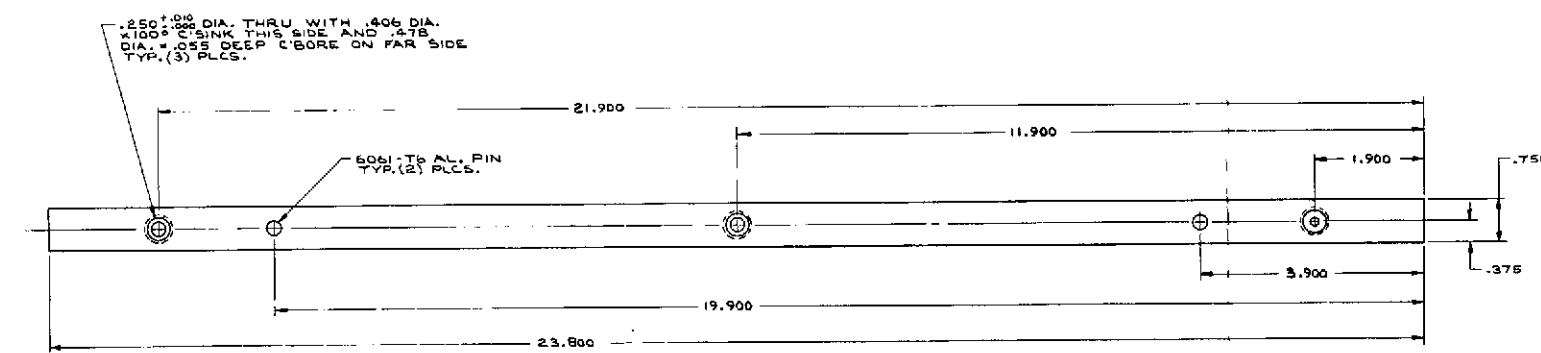
[illegible]

FCIDCUT FRAME

2

1

REVISED		DATE		APPROVED	
DATE	DESCRIPTION	DATE	APPROVED	DATE	APPROVED
	INITIAL RELEASE	11-12-78			



SHEET CONTENTS  
-019 PIN BAR ASSY.

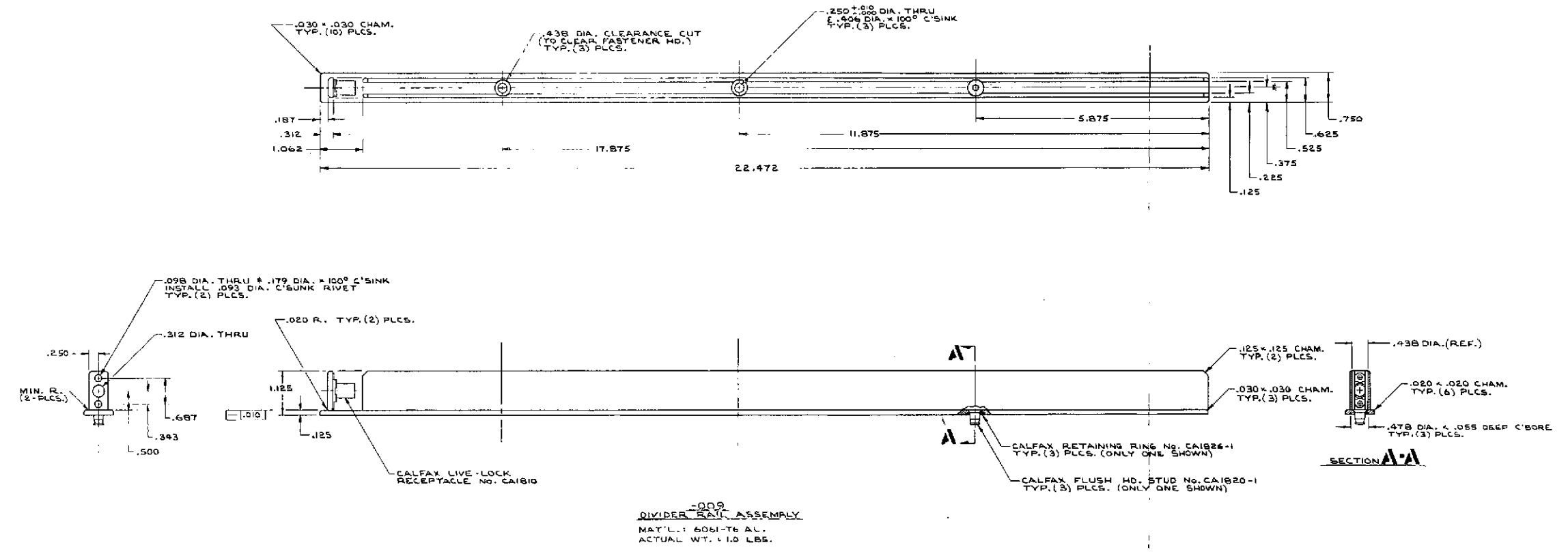
#### DIVIDER ASSEMBLY

AS	FOUR 0011	849USM00001
E	04236	
DATE	FULL	M. HUSSEY
		PAGE 2 OF 2



2

		12	
REVIEWED			
REF	DATE	DESCRIPTION	BY
		INITIAL RELEASE	11-6-73 HUSSEY

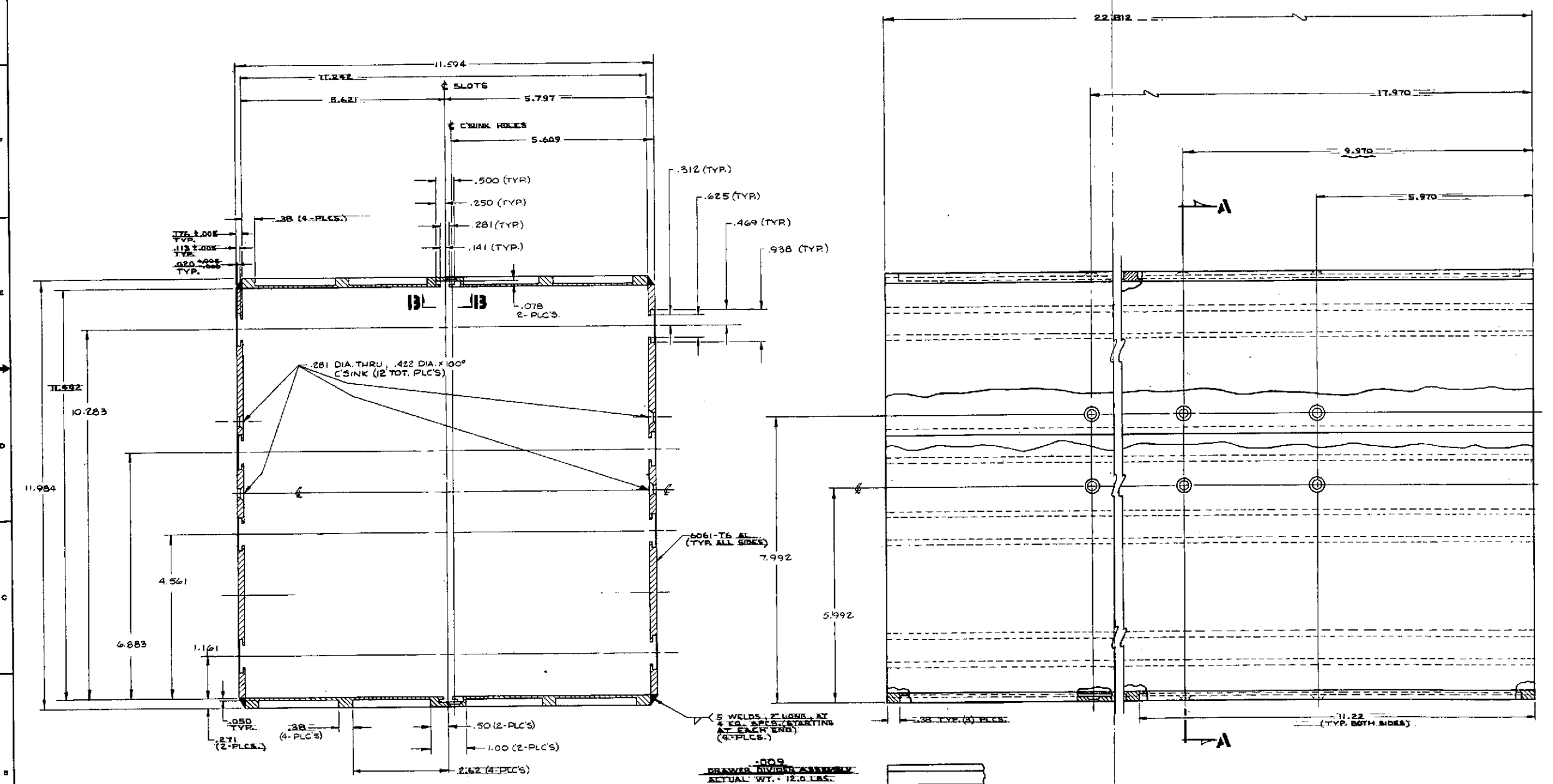


NOTES:

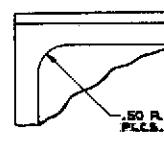
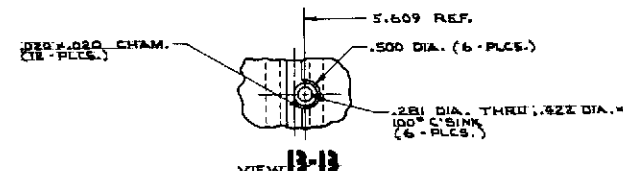
1. BREAK EDGES .015 UNLESS SPECIFIED OTHERWISE.
2. "NITUFF" PART PRIOR TO ASSY.
3. (2) PARTS REQ'D.

[illegible]

REVISIONS			
REV	DATE	DESCRIPTION	BY
1		INITIAL RELEASE	11-5-78 M. WILSON
2		UPDATED TO AS-BUILT CONFIG.	12-1-78 M. WILSON



SEC. A-A



NOTES

1. 1.25 ON ALL MACHINED SURFACES UNLESS OTHERWISE SPECIFIED.
2. BREAK ALL SHARP EDGES
3. FINE VAPOR HONE & CLEAR ANODIZE AFTER WELDING.

SHEET CONTENTS:  
-509 DRAWER DIVIDER  
ASSEMBLY

DRAWER DIVIDER

REV	DATE	DESCRIPTION	BY
1	11-5-78	INITIAL RELEASE	M. WILSON
2	12-1-78	UPDATED TO AS-BUILT CONFIG.	M. WILSON

849USM00003  
PULL T.P.J. GARDNER 1 OF 2

0 33	APC 10000000	
E	04236	849J5M00000
SCALE FULL		2002

NOTES:  
1. MAT'L. = 6061-T6 AL.  
2. FINE VAPOR HONE & CLEAR ANODIZE.  
3. (6) PARTS REQ'D.

007

72

Technical drawing of a mechanical part, likely a bracket or support, showing a front view and a side view.

Dimensions and Tolerances:

- Top flange width:  $.075$  WITH  $-.011$  TOLERANCE
- Bottom flange width:  $.250$  WITH  $-.012$  TOLERANCE
- Central opening width:  $.093$  DIA. FLUSH HD. RIVET (MATCH DRILL DRAWER) TYP. (3) PLS.
- Total height:  $2.510$

Legend:

- $\circ .011$
- $\circ .012$
- ( $-.012$  APPLIES ON SIDE OF DRAWING)

Technical drawing of a cabinet assembly, showing side and front views. The drawing includes the following callouts and dimensions:

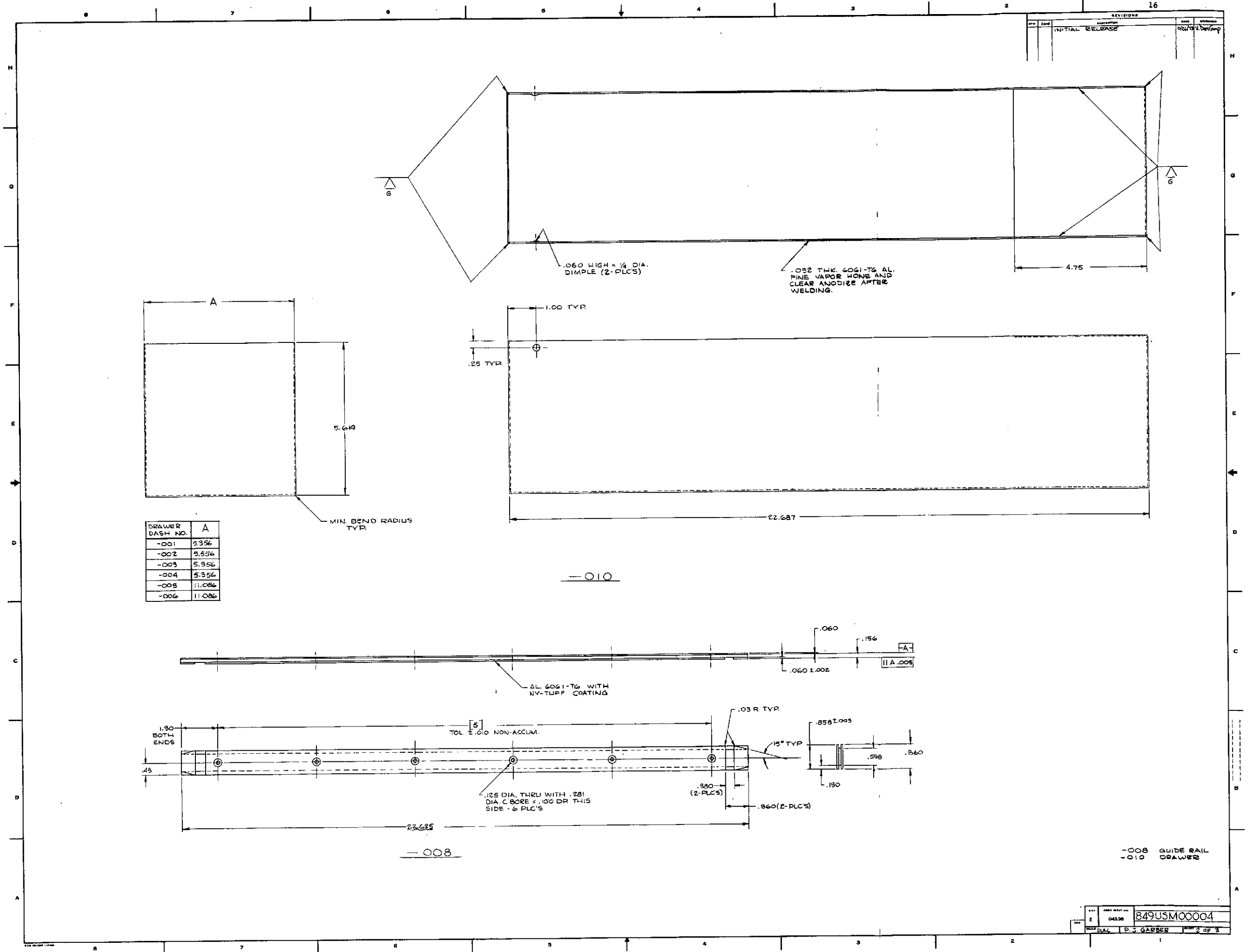
- Top Left:** Callouts (001) THRU (006) (LIDS) and (014) (015) pointing to hinge locations.
- Top Center:** Dimension .375-16UNC x .125 THK. HEX. NUT TYP. (2) PLCS.
- Top Right:** Text: INSTALL HINGE US FLUSH WD. RIVEYS SPACING (FLUSH WD).
- Bottom Left:** Dimension .06 TYP. pointing to a vertical edge.
- Bottom Center:** Callouts (008) and (010) (DRAWERS) pointing to drawer components.
- Bottom Right:** Text: MATCH DRILL DRAWER AND INSTALL.

✓ MATCH DRILL DRAWER AND INSTALL  
RAIL USING .125 DIA. UNIV. HD. RIVETS  
(FORM HD. IN RAIL C'BORE)

NOTES:  
1. COVER INSIDE OF DRAWER (ALL SURFACES)  
WITH .500 THK. ARMAFLEX FOAM RUBBER  
(EPOXY IN PLACE) DRAWER -002 ONLY

[illegible]

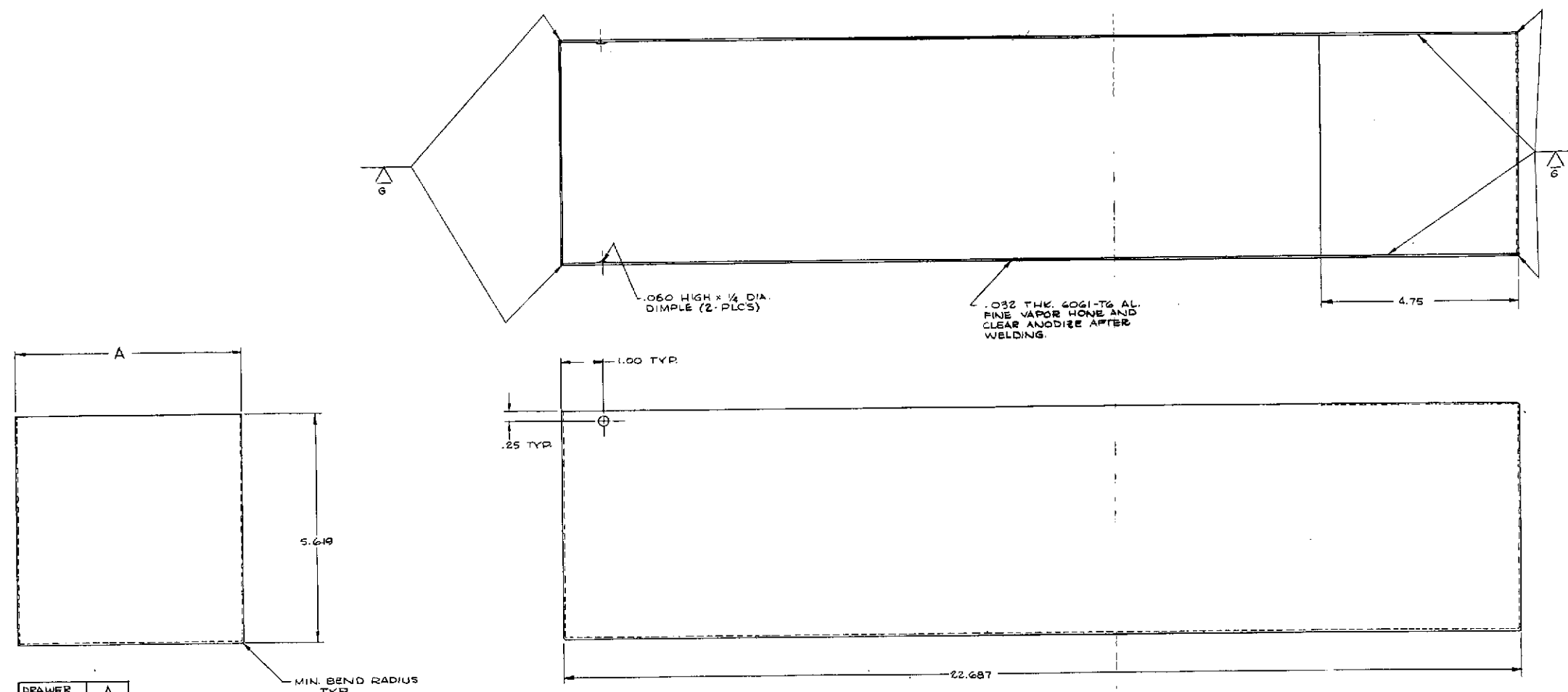
REVISIONS			
REV	DATE	DESCRIPTION	BY
1		INITIAL RELEASE	



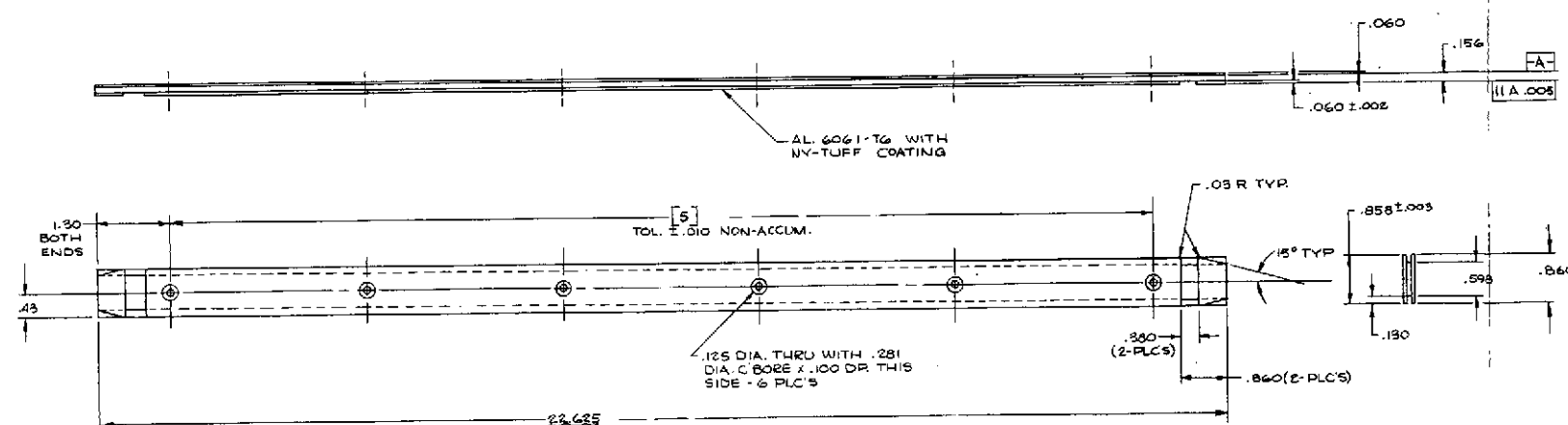
2

1

DATE		REVISIONS		DATE		APPROVAL	
TIME	DATE	DESCRIPTION		DATE		APPROVAL	
		INITIAL RELEASE		6/26/74		TH. D. DORR	



DRAWER DASH NO.	A
-001	5.356
-002	5.356
-003	5.956
-004	5.356
-005	11.086
-006	11.086



-008 GUIDE RAIL  
-010 DRAWER

SIZE	FOOT PRINT NO.	849USM00004
E	04236	
FILE	PULL	P. J. GARDER
		2 OF 3

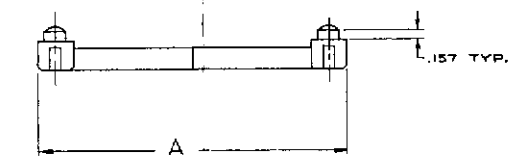
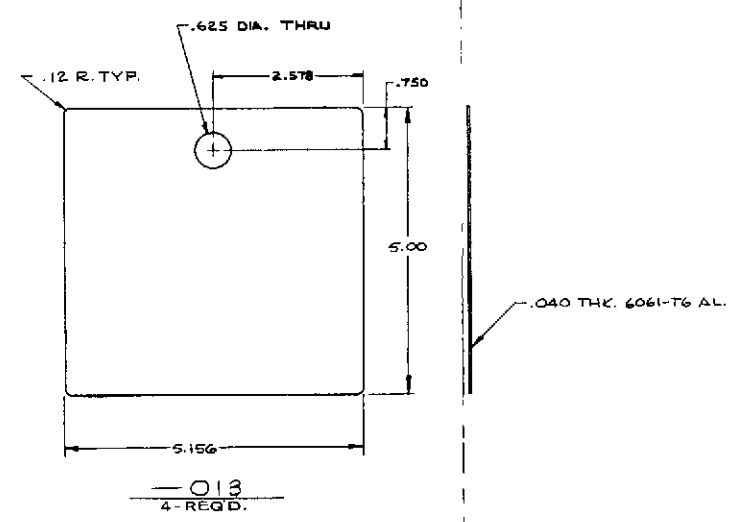
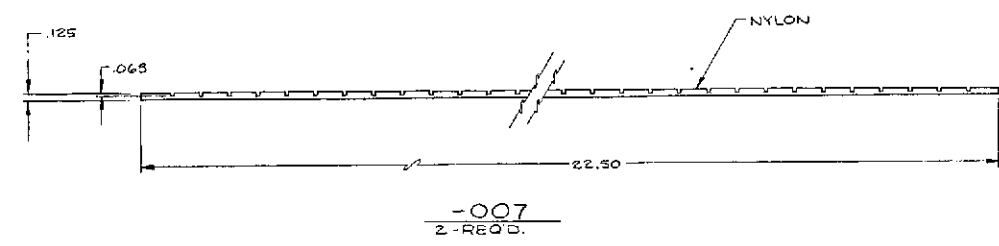
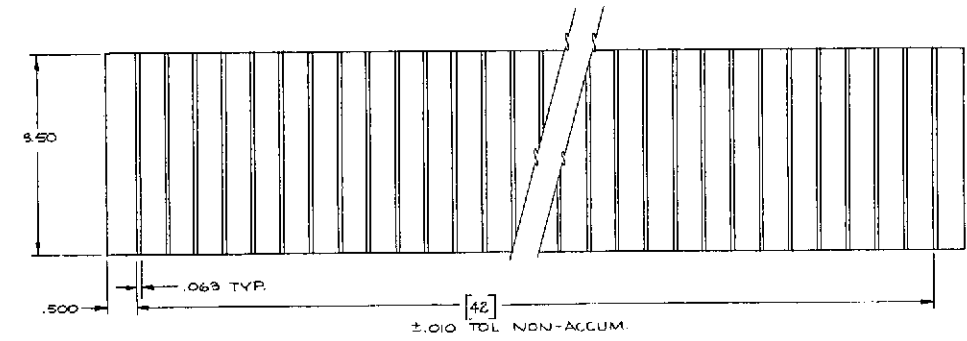
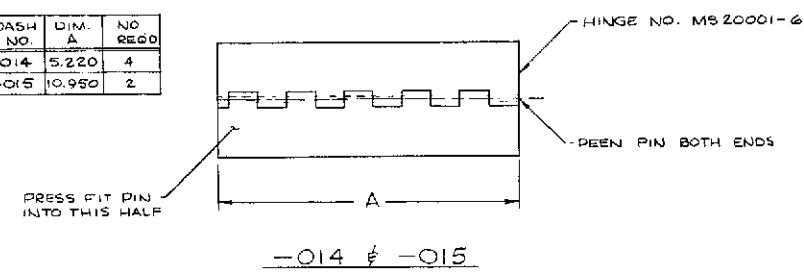
FOLDOUT FRAME 1

FOLDOUT FRAME 2

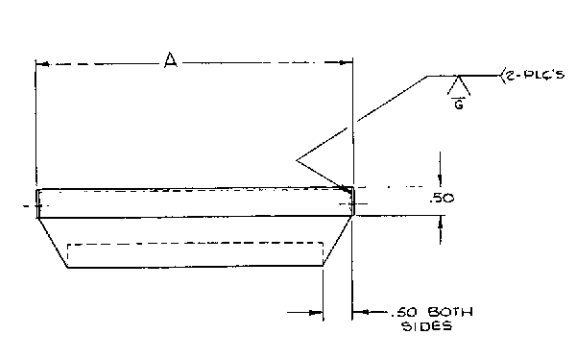
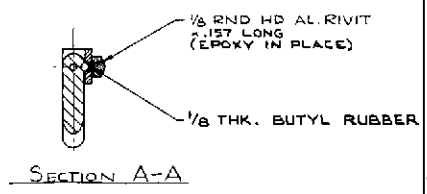
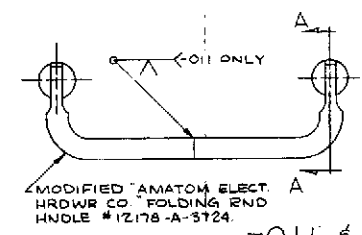
17

REVISIONS			
NO.	DATE	DESCRIPTION	BY
1		INITIAL RELEASE	11-78
2		UPDATED TO AS-BUILT CONFIG.	12-78

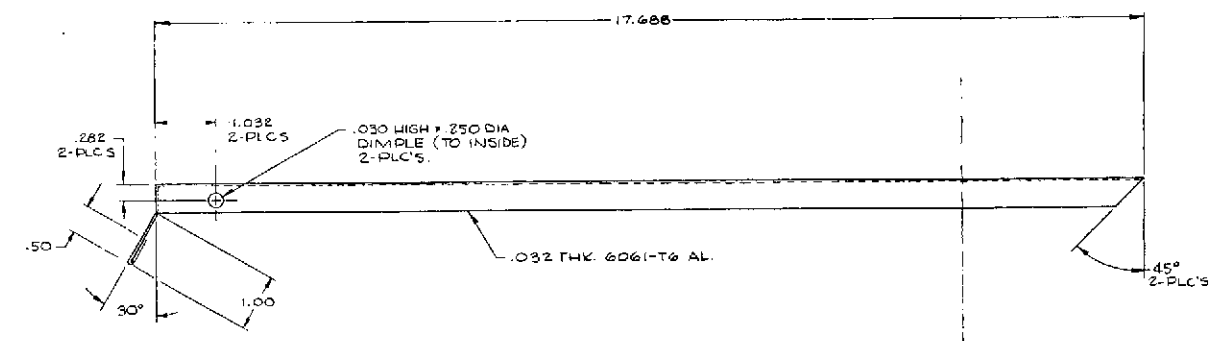
DASH NO.	DIM. A	NO. REQ'D
-014	5.220	4
-015	10.950	2



DASH NO.	DIM. A	NO. REQ'D
-011	5.28	4
-012	STK.	2



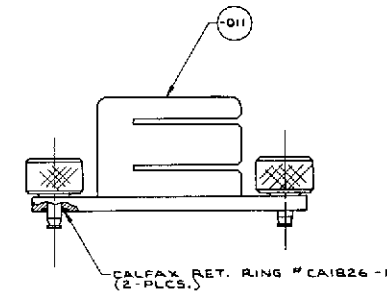
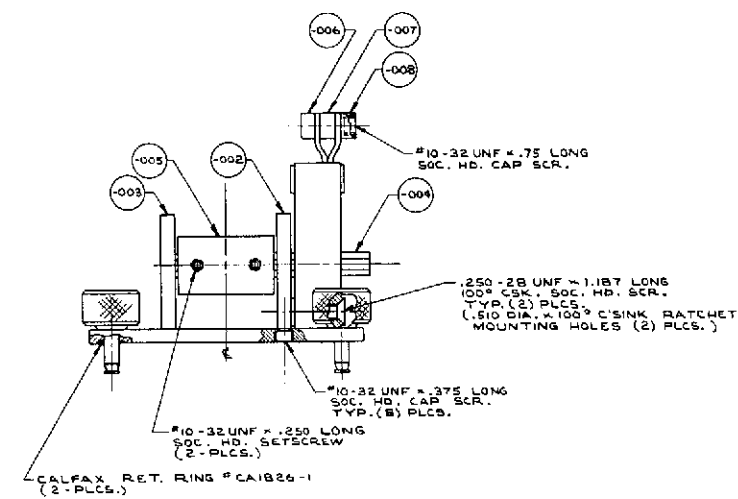
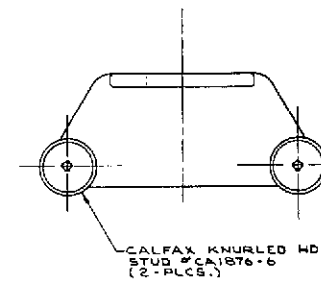
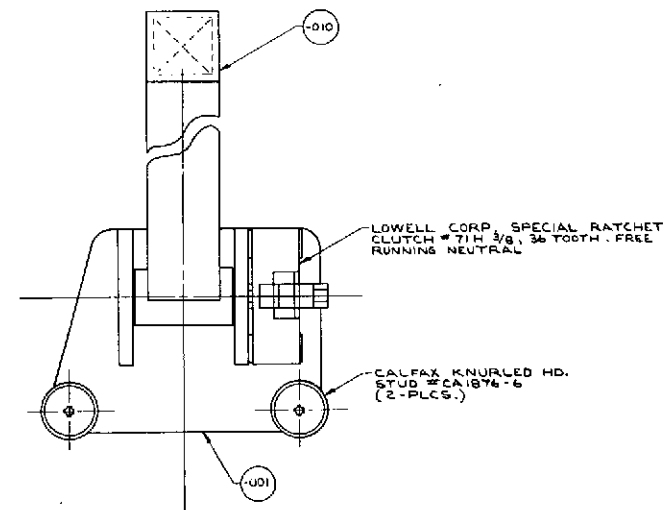
LID DASH NO.	DIM. A
-001	5.435
-002	5.435
-003	5.435
-004	5.435
-005	11.165
-006	11.165



SHEET CONTENTS  
-001 THRU -006 - DRAWER LIDS  
-007 - PARTITION GUIDES  
-011 & -012 - DRAWER HANDLE  
-013 - DRAWER PARTITION  
-014 & -015 - HINGES, DRAWER

GEN. NOTES

- 1. 1/32" FAO
- 2. BREAK ALL SHARP EDGES
- 3. VAPOR HONE AND CLEAR ANODIZE ALL ITEMS EXCEPT -007.



GEN. NOTES:  
1. FINE VAPOR HONE & CLEAR IRIDITE  
ALL ALUMINUM PARTS.

-019  
ANCHOR ASSEMBLY

-009  
RATCHET ASSEMBLY

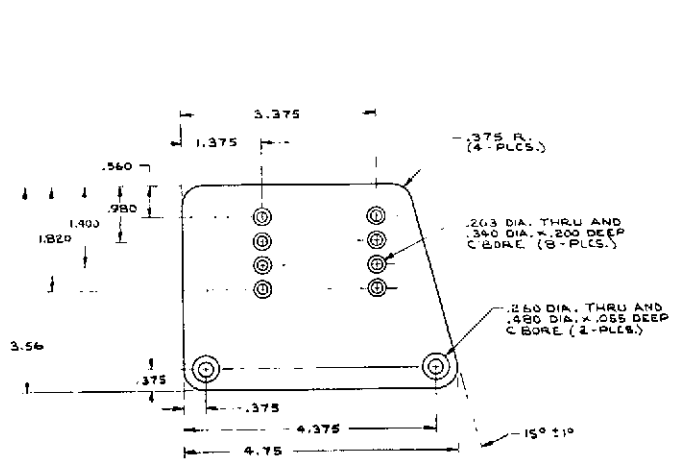
[illegible]



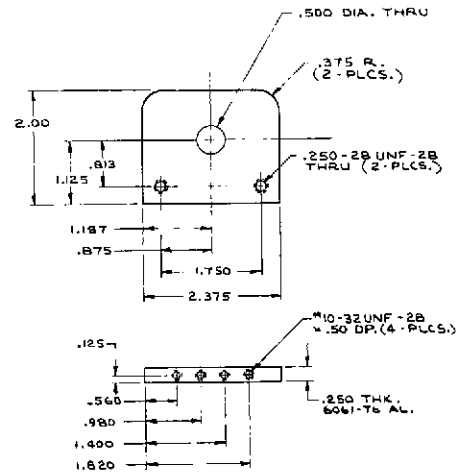
FOLDCUT FRAME 1

FOLDCUT FRAME 2

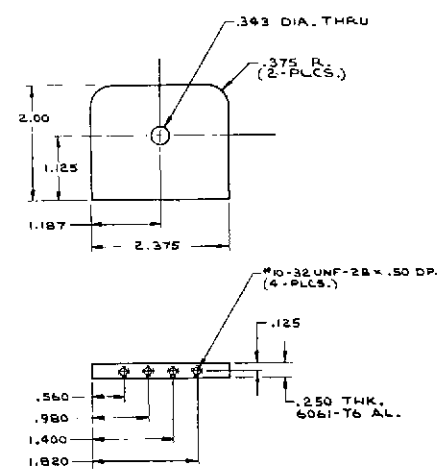
INITIAL RELEASE 11-27-78



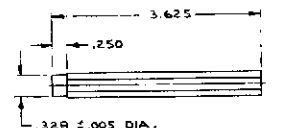
**-001  
BASE**  
NOTES:  
1. MAT'L: .250 THK. 6061-T6 AL.  
2. (2) PARTS REQ'D.



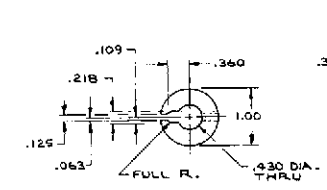
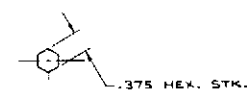
**-002  
SUPPORT MOUNT**  
NOTES:  
1. (2) PARTS REQ'D.



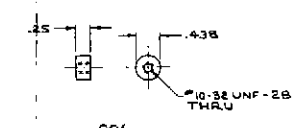
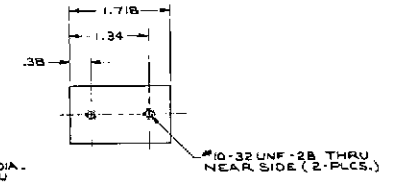
**-003  
SUPPORT**  
NOTES:  
1. (2) PARTS REQ'D.



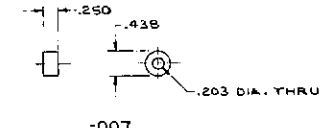
**-004  
SHAFT**  
NOTES:  
1. MAT'L: 303 CAES.  
2. (2) PARTS REQ'D.



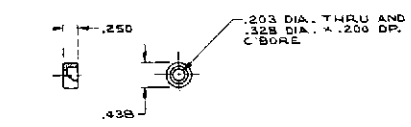
**-005  
DRUM**  
NOTES:  
1. MAT'L: 6061-T6 AL.  
2. (2) PARTS REQ'D.



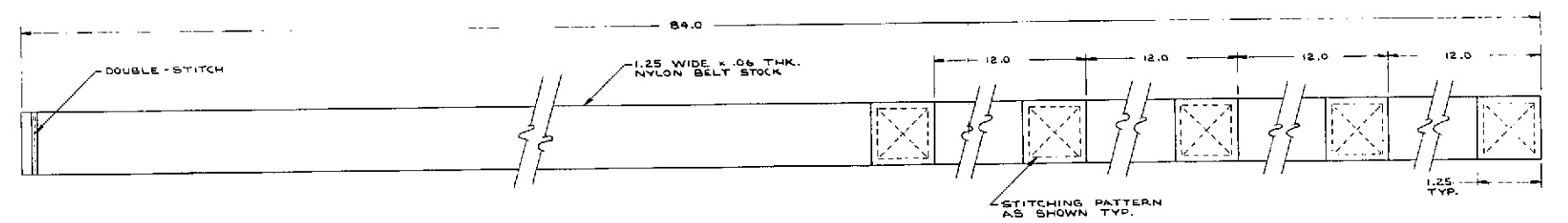
**-006  
HANDLE, THREADED**  
NOTES:  
1. MAT'L: 6061-T6 AL.  
2. (2) PARTS REQ'D.



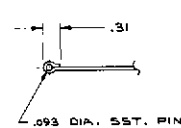
**-007  
HANDLE, SPACER**  
NOTES:  
1. MAT'L: 6061-T6 AL.  
2. (2) PARTS REQ'D.



**-008  
HANDLE, RECESSED**  
NOTES:  
1. MAT'L: 6061-T6 AL.  
2. (2) PARTS REQ'D.



**-010  
BELT**  
NOTES:  
1. (2) PARTS REQ'D.

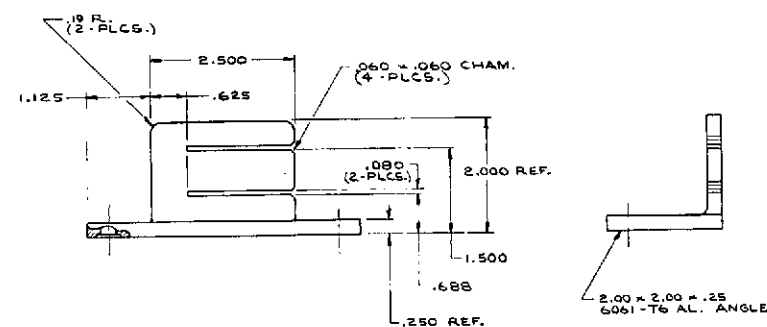
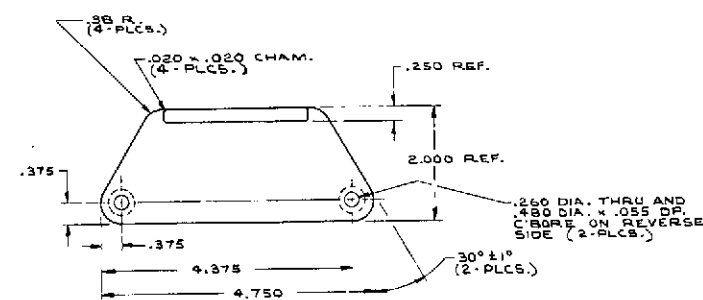


**SHEET CONTENTS:**  
-001 BASE  
-002 SUPPORT MOUNT  
-003 SUPPORT  
-004 SHAFT  
-005 DRUM  
-006 HANDLE, THREADED  
-007 HANDLE, SPACER  
-008 HANDLE, RECESSED  
-010 BELT

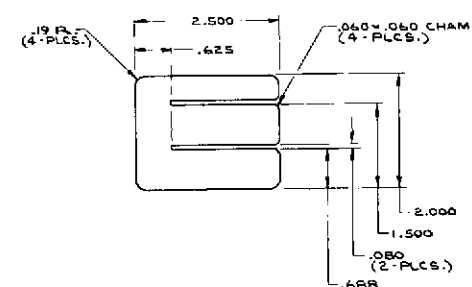
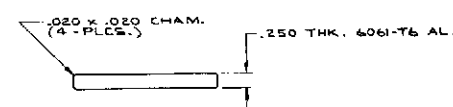
UNIVERSAL TIE-DOWN ASSEMBLY

849 USMO0005  
E 04218  
M. HUSSEY  
2 OF 3

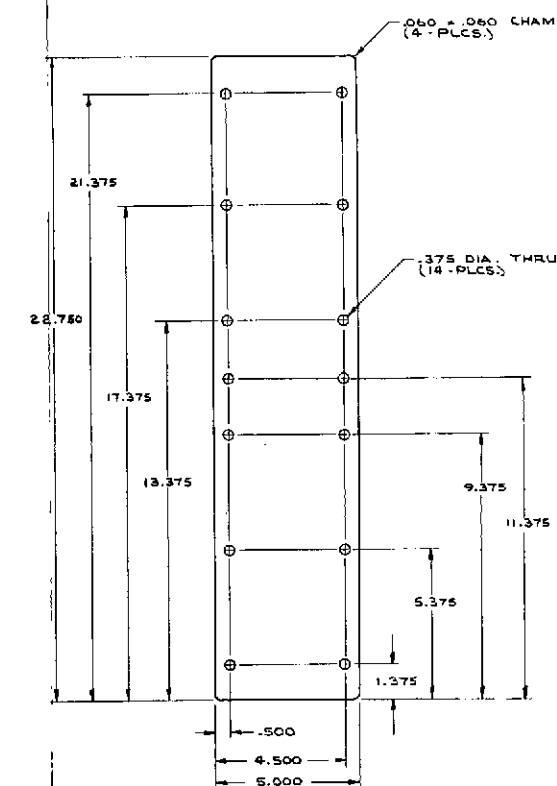
REVISIONS		DATE	BY
INITIAL RELEASE		11/27/73	D.



-011  
ANCHOR  
NOTES:  
1. BREAK EDGES .020  
2. (2) PARTS REQ'D.



-012  
BRACKET  
NOTES:  
1. BREAK EDGES .020  
2. (2) PARTS REQ'D.



-013  
MOUNTING PLATE  
SCALE: 1:1  
NOTES:  
1. BREAK EDGES .020  
2. MAT'L. .250 THK. 6061-T6 AL.  
3. (2) PARTS REQ'D.

SHEET CONTENTS:  
-011 ANCHOR  
-012 BRACKET  
-013 MOUNTING PLATE

UNIVERSAL TIE-DOWN ASSEMBLY

REV	DATE	BY	APP	DESCRIPTION
E	04/23/80			B49USM00005
FULL M. HUSSEY				3 OF 3